CLAIMS

What is claimed is:

1. A method of determining an approximated integrated response across an aperture within an optical system from light reflected off of a two-dimensional grating structure, comprising the steps of:

determining a first and second point within said aperture;

simulating a reflectance response of said light incident at said first point and said second point; and

determining an approximated integrated reflectance response of said aperture based on said reflectance response at said first point and said second point and determined characteristics of said optical system.

2. The method of claim 1, further comprising the steps of:

obtaining the numerical aperture of said optical system;

obtaining the light intensity distribution across said aperture; and

using a set of orthonormal functions to approximate a reflectance response for any wavelength from said two-dimensional grating structure.

3. The method of claim 1, wherein the step of determining said first point and said second point includes determining said first point along a first line substantially parallel to said

two-dimensional grating structure and determining said second point along a second line substantially parallel to said two-dimensional grating structure.

4. The method of claim 3, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

5. The method of claim 4, wherein when said numerical aperture is approximately 0.1 or less.

6. The method of claim 3, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

7. The method of claim 1, wherein the step of determining said first point and said second point includes determining said first point along a first line parallel to said two-dimensional grating structure and determining said second point along a second line parallel to said two-dimensional grating structure.

8. The method of claim 7, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

9. The method of claim 8, wherein when said numerical aperture is approximately 0.1 or less.

10. The method of claim 7, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

11. The method of claim 1, wherein said determined characteristics comprise a first weight of said light intensity distribution at said first point and a second weight of said light intensity distribution at said second point.

12. The method of claim 11, wherein the step of determining said approximated integrated reflectance response includes using the following equation:

$$w_1 R(x_1) + w_2 R(x_2)$$

where,

x_1 = a location of said first point;

x_2 = a location of said second point;

w_1 = said weight of said light intensity distribution at said first point;

w_2 = said weight of said light intensity distribution at said second point;

$R(x_1)$ = said simulated reflectance response of light incident at said first point; and

$R(x_2)$ = said simulated reflectance response of light incident at said second point.

13. The method of claim 1, wherein said light intensity distribution across said aperture is uniform.

14. The method of claim 1, wherein said light intensity distribution across said aperture is not uniform.

15. The method of claim 2, where said orthonormal function is one of a polynomial or a Fourier series.

16. The method of claim 15, wherein said orthornormal function is one of a $(4k\text{-}2)^{th}$ even polynomial function.

17. The method of claim 16, wherein k is a value sufficient such that when used, said $(4k\text{-}2)^{th}$ even polynomial function approximates said reflectance response for said resulting wavelength.

18. A computer-readable storage medium containing computer executable code for simulating an integrated response across an aperture within an optical system from light reflected off of a two-dimensional grating structure by instructing a computer to operate as follows:

determine a first and second point within said aperture;

simulate a reflectance response of said light incident at said first point and said second point; and

determine said approximated integrated reflectance response of said aperture based on said reflectance response at said first point and said second point and determined characteristics of said optical system.

19. The computer readable storage medium of claim 18, wherein said computer is further instructed to:

obtain the numerical aperture of said optical system;

obtain the light intensity distribution across said aperture; and

use a set of orthonormal functions to approximate a reflectance response for any wavelength from said two-dimensional grating structure.

20. The computer readable storage medium of claim 18, wherein said executable code instructs said computer to determine said first point along a first line substantially parallel to said two-dimensional grating structure and to determine said second point along a second line substantially parallel to said two-dimensional grating structure.

21. The computer readable storage medium of claim 20, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

22. The computer readable storage medium of claim 21, wherein when said numerical aperture is approximately 0.1 or less.

23. The computer readable storage medium of claim 20, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

24. The computer readable storage medium of claim 18, wherein said executable code instructs said computer to determine said first point along a first line parallel to said two-

dimensional grating structure and to determine said second point along a second line parallel to said two-dimensional grating structure.

25. The computer readable storage medium of claim 24, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

26. The computer readable storage medium of claim 25, wherein when said numerical aperture is approximately 0.1 or less.

27. The computer readable storage medium of claim 24, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

28. The computer readable storage medium of claim 18, wherein said determined characteristics comprise a first weight of said response at said first point and a second weight of said response at said second point.

29. The computer readable storage medium of claim 28, wherein said approximated integrated reflectance response is determined by using the following equation:

$$w_1R(x_1) + w_2R(x_2)$$

where,

x_1 = a location of said first point;

x_2 = a location of said second point;

w_1 = said weight of said light intensity distribution at said first point;

w_2 = said weight of said light intensity distribution at said second point;

$R(x_1)$ = said simulated reflectance response of light incident at said first point; and

$R(x_2)$ = said simulated reflectance response of light incident at said second point.

30. The computer readable storage medium of claim 18, wherein said light intensity distribution is uniform across said aperture.

31. The computer readable storage medium of claim 18, wherein said light intensity distribution is not uniform across said aperture.

32. The computer readable storage medium of claim 19, where said orthonormal function is one of a polynomial or a Fourier series.

33. The computer readable storage medium of claim 32, wherein said orthornormal function is one of a $(4k\text{-}2)^{th}$ even polynomial function.

34. The computer readable storage medium of claim 33, wherein k is a value sufficient such that when used, said $(4k\text{-}2)^{th}$ even polynomial function approximates said reflectance response for said resulting wavelength.

35. A system for determining an integrated response across an aperture within an optical system from light reflected off of a two-dimensional grating structure, comprising:

a device for determining a first and second point within said aperture;

a device for simulating a reflectance response of said light incident at said first point and said second point; and

a device for determining said approximated integrated reflectance response of said aperture based on said reflectance response at said first point and said second point and a weight of said light intensity distribution incident at said first point and said second point.

36. The system of claim 35, further comprising:

means for obtaining the numerical aperture of said optical system;

means for obtaining the light intensity distribution across said aperture; and

means for using a set of orthonormal functions to approximate a reflectance response for any wavelength from said two-dimensional grating structure.

37. The system of claim 35, wherein the step of determining said first point and said second point includes determining said first point along a first line substantially parallel to said two-dimensional grating structure and determining said second point along a second line substantially parallel to said two-dimensional grating structure.

38. The system of claim 37, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

39. The system of claim 38, wherein when said numerical aperture is approximately 0.1 or less.

40. The system of claim 37, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

41. The system of claim 35, wherein the step of determining said first point and said second point includes determining said first point along a first line parallel to said two-dimensional grating structure and determining said second point along a second line parallel to said two-dimensional grating structure.

42. The system of claim 41, wherein said numerical aperture is such that said reflectance response at said first point approximates said reflectance response for said entire first line and said reflectance response at said second point approximates said reflectance response for said entire second line.

43. The system of claim 42, wherein when said numerical aperture is approximately 0.1 or less.

44. The system of claim 41, wherein the step of determining said first point and said second point includes determining said first point at a center of said first line and determining said second point at a center of said second line.

45. The system of claim 35, wherein said determined characteristics comprise a first weight of said response at said first point and a second weight of said response at said second point.

46. The system of claim 45, wherein said device for determining said approximated integrated reflectance response uses the following equation:

$$w_1 R(x_1) + w_2 R(x_2)$$

where,

x_1 = a location of said first point;

x_2 = a location of said second point;

w_1 = said weight of said light intensity distribution at said first point;

w_2 = said weight of said light intensity distribution at said second point;

$R(x_1)$ = said simulated reflectance response of light incident at said first point; and

$R(x_2)$ = said simulated reflectance response of light incident at said second point.

47. The system of claim 35, wherein said light intensity distribution across said aperture is uniform.

48. The system of claim 35, wherein said light intensity distribution across said aperture is not uniform.

49. The system of claim 36, where said orthonormal function is one of a polynomial or a Fourier series.

50. The system of claim 49, wherein said orthornormal function is one of a $(4k\text{-}2)^{th}$ even polynomial function.

51. The system of claim 50, wherein k is a value sufficient such that when used, said $(4k\text{-}2)^{th}$ even polynomial function approximates said reflectance response for said resulting wavelength.